U.S. Patent No. 5,645,596, in view of Ogawa, U.S. Patent No. 5,030,611, and further in view of JP 2-225382.

In response, Applicants note that claim 1 is directed to a method of manufacturing a ceramic composite, the method comprising:

preparing at least two ceramic bodies to be bonded together, each of the at least two ceramic bodies having a bonding surface;

preparing a slurry in which primary particles of a bonding ceramic are dispersed, said slurry being synthesized by merely adding a phosphoric compound to a calcium compound slurry;

applying the slurry to the bonding surface of at least one of the ceramic bodies to be bonded; and

sintering the ceramic bodies between which the slurry has been interposed to obtain fusing and growing of the primary particles of a bonding ceramic in the slurry during the sintering and bonding of the at least two ceramic bodies together.

Moreover, claim 19 is directed to a method of manufacturing a ceramic composite, the method comprising:

preparing at least two ceramic bodies to be bonded together, each of the at least two ceramic bodies having a bonding surface;

preparing a slurry in which primary particles of a bonding ceramic are dispersed in the absence of organic components;

applying the slurry to the bonding surface of at least one of the ceramic bodies to be bonded; and

sintering the ceramic bodies between which the slurry has been interposed to obtain fusing and growing of the primary particles of a bonding ceramic in the slurry during the sintering and bonding of the at least two ceramic bodies together.

Applicants' method recited in independent claim 1 includes, amongst other features, preparing a slurry in which primary particles of a bonding ceramic are dispersed, said slurry being synthesized by merely adding a phosphoric compound to a calcium compound slurry. In other words, Applicants' method includes a simple wet process wherein the synthesized slurry formed by adding a phosphoric compound to a calcium compound is used without adding other substances, whereby it is obtained by merely adding a phosphoric compound to a calcium compound slurry. Moreover, the slurry is in the form of primary particles of a bonding ceramic so that the particles can grow during the sintering process and then fuse. This enables the provision of enhanced bonding strength between the ceramic bodies.

Moreover, Applicants' method recited in independent claim 19 includes, amongst other features, preparing a slurry in which primary particles of a bonding ceramic are dispersed in the absence of organic components. This means that the slurry that is applied to the ceramic bodies to be bonded does not contain any water-soluble polymers such as binders, that is the ceramic composite does not contain any organic components. Accordingly, the ceramic composite of the present invention eliminates the danger that these organic components will elute into the living body when Applicants' ceramic composite is used as a biocompatible material. Moreover, the slurry is in the form of primary particles of a bonding ceramic so that the particles can grow during the sintering process and then fuse. This enables the provision of enhanced bonding strength between

the ceramic bodies.

In contrast, Kim is directed to a method for manufacturing a ceramic vertebrae prosthesis, which also discloses that an apatite slurry is interposed between dense and porous bodies, and the bodies are then sintered to bond them together. **Kim is silent as to whether the slurry is a slurry in which primary particles of a bonding ceramic are dispersed**, and that the slurry is synthesized by merely adding a phosphoric compound to a calcium compound slurry, as recited in claim 1. Moreover, **Kim is silent as to whether the slurry is a slurry in which primary particles of a bonding ceramic are dispersed in the absence of organic components**, as recited in claim 19.

As previously pointed out by Applicants, the particles of the bonding ceramic contained in the slurry being in the form of primary particles enables the provision of enhanced bonding strength between the ceramic bodies. In particular, the bonding ceramic in the form of such primary particles grow during the sintering process to be in a fused state, thereby enabling to firmly and strongly bond the ceramic bodies together when the slurry is used as a binder. In contrast, if a bonding ceramic in the form of secondary particles which have been already subjected to a heat treatment are used, the particles are difficult to grow and fuse during the sintering process, so that it is difficult to obtain the firm bonding of the ceramic bodies like in the present invention. Again, **it is noted that Kim is silent as to whether the particles contained in the slurry are in the form of primary particles.**

In an attempt to overcome the deficiencies of Kim, the rejection relies upon the disclosure of Ogawa. However, there is no motivation to combine the disclosure of Kim and Ogawa. Moreover, even if for the sake of argument, the disclosures of Kim and Ogawa are combined, the instantly claimed invention would not be at hand.

Initially, it is noted that Ogawa appears to disclose the use of a slurry in which primary particles are dispersed. However, **the slurry disclosed in Ogawa is used for a granulating purpose by spray drying or the like. Ogawa does not disclose that its slurry should be used as a binding material**. Ogawa simply discloses that a slurry in which primary particles may be dispersed can be produced as part of the intermediate process for manufacturing a packing for chromatography or the like. Ogawa does not teach or suggest that the slurry produced in the intermediate process is used for purposes other than granulation. In other words, Ogawa does not teach or suggest that the slurry is used as a binder for bonding ceramic bodies as in the present invention.

Thus, there is no motivation outside Applicants' disclosure to utilize a slurry as disclosed by Ogawa, in Kim's ceramic vertebrae prosthesis. In this regard, Applicants respectfully submit that the only teaching or suggestion that would lead one having ordinary skill in the art to arrive at Applicants' invention is within Applicants' disclosure, and the use of such disclosure by the Examiner is improper. In order to support the conclusion that the claimed invention is either anticipated or rendered obvious over the prior art, the prior art must either expressly or inherently teach the claimed invention or the Examiner must present a convincing line of reasoning why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Ex parte Clapp, 227 U.S.P.Q. 972 (B.O.A. 1985).

Still further, even if for the sake of argument the disclosures of Kim and Ogawa were combined, the instantly claimed invention would not be present. In this regard, there would be no reason to use the ceramic granules, or slurry of Ogawa as a binder in Kim.

Accordingly, the rejection of claims 1-8 and 11-19 based upon Kim in view of Ogawa should be withdrawn.

With regard to claims 9 and 10, Applicants once again note that JP 2-225382 discloses a bonding material for ceramics. The bonding material is composed of an aqueous solution of a water-soluble polymer and a ceramic material contained therein as a filler. In JP 2-225382, the filler is obtained by forming the ceramic material powder into spherical secondary particles by granulating the ceramic material powder with spray drying, and then by milling or crushing the secondary particles. Alternately, JP 2-225382 discloses that the filler may be used in the form of ceramic material powder whose average particle size is in the range of 0.1 to 15 μm.

Moreover, in JP 2-225382, the ceramic material is used once after it is formed into powder (secondary particles) while according to the presently claimed invention a bonding ceramic in the form of the slurry which is obtained just after synthesization is used. Further, the method according to JP 2-225382 essentially requires that the obtained powder is mixed into the aqueous solution of the water-soluble polymer. Although JP 2-225382 suggests that the filler can be used in the form of ceramic material powder, JP 2-225382 is silent as to whether or not the powder is primary particles like the particles in the instantly claimed invention.

Accordingly, JP 2-225382 does not overcome the deficiencies of Kim and Ogawa. Moreover, one having ordinary skill in the art would not be motivated to utilize the disclosure of Kim whether alone or modified with Ogawa to arrive at Applicants' invention as recited in claims 9 and 10. Accordingly, this ground of rejection should also be withdrawn.

Additionally, each of the dependent claims is patentable over the prior art of record in view

of the fact that each of these dependent claims includes the limitations of the independent claim. Moreover, each of the dependent claims is patentable over the prior art of record because it would not have been obvious to one having ordinary skill in the art to incorporate such dependent claim features into the invention as more broadly recited in the independent claim.

For example, Applicants once again respectfully submit with regard to claims 17 and 18 that the ceramic composite and bone replacement material recited therein are patentable over the prior art, because the products recited therein are not taught or suggested in the prior art especially in view of the differences in the slurry as discussed above. As noted above, the products of claims 1 and 19 include ceramic composite which eliminate the danger that organic components will elute into the living body when Applicants' ceramic composite is used as a biocompatible material. Moreover, the slurry is in the form of primary particles of a bonding ceramic so that the particles can grow during the sintering process and then fuse. This difference in structure enables the provision of enhanced bonding strength between the ceramic bodies in Applicants' ceramic composite.

Accordingly, the rejections of record should be withdrawn as improper, and all of the claims should be indicated as allowable over the prior art.

CONCLUSION

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow each of the pending claims.

Applicants therefore respectfully request that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

Should the Examiner have any questions regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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APPENDIX

Marked-Up Copy Of Amended Claims 1 and 19

1. (Twice Amended) A method of manufacturing a ceramic composite, the method comprising:

preparing at least two ceramic bodies to be bonded together, each of the at least two ceramic bodies having a bonding surface;

preparing a slurry in which primary particles of a bonding ceramic are dispersed, said slurry being synthesized by merely adding a phosphoric compound to a calcium compound slurry;

applying the slurry to the bonding surface of at least one of the ceramic bodies to be bonded; and

sintering the ceramic bodies between which the slurry has been interposed to [bond them] <u>obtain fusing and growing of the primary particles of a bonding ceramic in the slurry during the sintering and bonding of the at least two ceramic bodies together</u>.

19. (Amended) A method of manufacturing a ceramic composite, the method comprising:

preparing at least two ceramic bodies to be bonded together, each of the at least two ceramic bodies having a bonding surface;

preparing a slurry in which primary particles of a bonding ceramic are dispersed in the absence of organic components;

applying the slurry to the bonding surface of at least one of the ceramic bodies to be bonded; and

sintering the ceramic bodies between which the slurry has been interposed to [bond them]

obtain fusing and growing of the primary particles of a bonding ceramic in the slurry during the sintering and bonding of the at least two ceramic bodies together.